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Small Quantity Generator's Handbook for Managing RCRA (Resource Conservation and Recovery Act) Wastes Pesticide Application

Science Applications International Corp., Bellevue, WA

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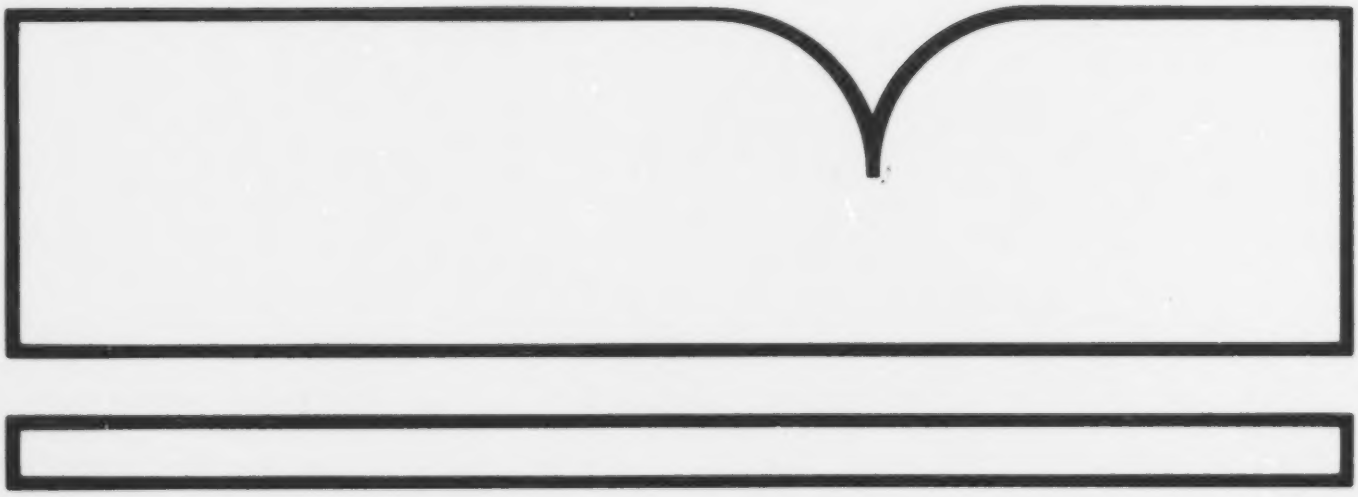

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This RCRA Handbook was developed for pesticide applicators to provide assistance in complying with pertinent sections of the RCRA requirements. Section 2 summarizes operations of pesticide users and describes potential waste types that could be generated from these operations. Section 3 provides a guide for determining if a particular pesticide waste is subject to these regulations. Section 4 discusses the RCRA generator requirements, while Section 5 describes waste management strategies for minimizing the amount of hazardous waste generated by the pesticide applicators. Appendix A lists hazardous wastes. Appendix B summarizes RCRA characteristic wastes. Appendix C contains a list of references and contacts for obtaining more information about hazardous wastes and their regulation.

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THE SMALL QUANTITY GENERATOR'S HANDBOOK FOR MANAGING RCRA WASTES

- PESTICIDE APPLICATION -

STATE OF MONTANA
DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES
HELENA, MONTANA

JUNE, 1988

THE SMALL QUANTITY GENERATOR'S HANDBOOK FOR MANAGING RCRA WASTES

- PESTICIDE APPLICATION -

Prepared for:

State of Montana
Department of Health and Environmental Sciences
Helena, Montana

Prepared by:

Science Applications International Corporation
Bellevue, Washington

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TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
2.0	PESTICIDE USERS AND POTENTIAL WASTE TYPES	3
	2.1 Summary of Operations	3
	2.2 Pesticide Characteristics	6
	2.3 Waste Types	7
3.0	HAZARDOUS WASTE REGULATIONS	10
	3.1 Federal Hazardous Waste Regulations	10
	3.2 State Hazardous Waste Regulations	10
	3.3 Applicability of Federal and State Regulations to Pesticide Users	10
	3.4 Specific Regulations for Farmers	16
4.0	HAZARDOUS WASTE GENERATOR REQUIREMENTS	17
	4.1 Background	17
	4.2 Categories of Generators	17
	4.3 Requirements for All Generators	17
4.4	Requirements for Conditionally Exempt Generators	19
	4.5 Requirements for Small Generators	20
5.0	WASTE MANAGEMENT PLANS	24
	5.1 Unused Chemical Products	25
	5.2 Pesticide Residue/Rinse Water	25
	5.3 Empty Containers	26
	5.4 Debris from Spill Cleanup	27

APPENDIX A - List of Acute and Toxic Hazardous Wastes

APPENDIX B - Identifying RCRA Characteristic Hazardous Wastes

APPENDIX C - References and Contacts

1.0 INTRODUCTION

In 1976, Congress, recognizing that the problem of solid and hazardous waste disposal had become a national concern, passed the Resource Conservation and Recovery Act (RCRA). This legislation was designed to address two major problems:

- The dangers to human health and the environment posed by improper waste disposal
- The conservation of valuable material and energy resources

Subtitle C of RCRA establishes a "cradle-to-grave" hazardous waste management system, which is administered by the U.S. Environmental Protection Agency (EPA). This system provides for managing, tracking, and regulating hazardous wastes at each step of the way from generation to final disposal. The regulations developed by EPA apply to those who generate, transport, treat, store, or dispose hazardous wastes.

This RCRA Handbook was developed for pesticide applicators to provide assistance in complying with pertinent sections of the RCRA requirements. The manual also provides waste management strategies for minimizing waste quantities. Waste minimization has economic advantages including reducing the costs required to comply with the RCRA requirements and reducing product requirements if waste recycling or reuse is practiced.

The information on the operations of pesticide applicators in this document was compiled through site visits to county weed districts, and aerial, seed treatment, and grain elevator applicators. These site visits were conducted to identify the types and quantities of both hazardous and non-hazardous wastes typically generated, and to observe current waste management practices. Following these visits, a pesticide-specific review of the RCRA regulations and the Administrative Rules of Montana (ARM) was performed to identify applicable regulations.

Section 2.0 of this manual summarizes operations of pesticide users and describes potential waste types that could be generated from these

operations. Section 3.0 provides a guide for determining if a particular pesticide waste is subject to these regulations. Section 4.0 discusses the RCRA generator requirements, while Section 5.0 describes waste management strategies for minimizing the amount of hazardous waste generated by the pesticide applicators. Two tables listing hazardous wastes can be found in Appendix A. Table A-1 is a listing of acute hazardous wastes and Table A-2 is a listing of toxic wastes. Appendix B provides a summary of RCRA Characteristic Wastes. Finally, Appendix C contains a list of references and contacts for obtaining more information about hazardous wastes and their regulation.

2.0 PESTICIDE USERS AND POTENTIAL WASTE TYPES

This section summarizes the typical operations of pesticide applicators, specifically, aerial applicators, ground applicators, seed treaters, and grain elevators. Potential waste types that could be generated from these operations are also discussed.

2.1 SUMMARY OF OPERATIONS

2.1.1 Aerial Applicators

Aerial applicators use a variety of insecticides and herbicides in their seasonal operations. The specific insecticides and herbicides selected are based upon the crop to be protected, the crop growing stage, the degree of crop protection required, cost, expected weather conditions, and the type of insect and/or weed to be controlled. Herbicides are more commonly used than insecticides by aerial applicators (in terms of frequency and quantities) due to the greater number of weeds and rate of weed growth needing to be controlled. Herbicides are generally applied during the late spring through early fall. Insecticides are used on an infrequent basis, their use arising out of need to control specific insect problems encountered during the season. Insecticides are generally used during the spring through mid-summer.

Herbicide and insecticide products are obtained from a vendor or distributor in containers of varying quantities, ranging from quart-size containers to 55-gallon drums. These containers can be constructed of either plastic or metal. The quantities of herbicides ordered from the vendor or distributor are based on an anticipated demand. The more commonly used herbicides, such as 2,4-D, are ordered in 30- or 55-gallon containers, and in large enough quantities to last for up to four weeks. Less commonly used herbicides can be obtained in smaller containers. Insecticides are usually ordered on an "as needed" basis, usually in small containers ranging from 2.5 gallons to 30 gallons in size.

The insecticides and herbicides are usually obtained from a vendor or distributor in concentrated form, and are diluted with water prior to appli-

cation. The concentrated formulated pesticide is mixed with water in a mixing tank or large drum to obtain the recommended mixture. This mixture is then pumped or poured into the storage tank of the aircraft, ready for application. In some cases where the applicator uses different pesticides, the mixing tank or drum is rinsed out with water, and the rinse water may be put back into the system for spraying onto the fields at labelled application rates.

The insecticides and herbicides are dispensed from storage tanks carried within the plane and then sprayed during low passes over the crops or application site. Nozzles placed along the length of the wing provide the mechanism for crop spraying. In some instances where different pesticides are used for specific applications, the storage tank is rinsed out at the end of the flight. The rinseate may be collected and stored, if necessary, before being recycled into other mixtures for spraying on the fields.

Some types of herbicides are acidic in nature, and in a few cases, the storage tanks on the aircraft are rinsed with a neutralizer, such as ammonia, to remove any residues. This rinseate is collected and recycled with the next appropriate aerial application.

The empty containers are usually triple rinsed with water or rinsed by an equivalent method, such as a pump spray system. The rinse waters are collected and recycled for subsequent application. In general, the rinsed containers are punctured and crushed, then taken to a state-licensed sanitary landfill. Some plastic or teflon-lined metal containers can be recycled by distributors.

2.1.2 Ground Applicators

County weed districts generally use ground equipment to apply herbicides, and, at times, also apply insecticides and herbicides. Generally, the herbicides are applied for weed control at airports, landfills, along road right-of-ways, and on private property. In addition, some of the weed districts periodically use insecticides to control mosquitoes during the summer months if they have established formal mosquito districts. The handling of the pesticide products for the county weed districts is similar

to that of the aerial applicators, except that the counties generally have a more extensive operation requiring larger quantities of pesticides. The more commonly used herbicides are generally obtained in 30- or 55-gallon containers. The specific herbicides and insecticides are obtained in smaller containers ranging from the quart-size to the 30-gallon containers. The pesticides are usually ordered in large enough quantities to last throughout the season.

The county weed districts generally have a designated chemical storage area for pesticide products during the application season. This storage area may consist of a dedicated storage shed or an area within a county-owned shop or garage. Excess pesticides not used during the application season may be stored until the next season. Some county weed districts are licensed to sell pesticides to individuals for personal use; therefore, additional pesticides may be stored in the designated storage areas.

As in the case of the aerial applicators, the insecticides and herbicides are usually obtained from a vendor or distributor in a concentrated form and diluted prior to application. The pesticide is generally mixed with water either in the holding tank located on the spraying vehicle or in a separate mixing tank. If pesticide is mixed in a separate tank it is then pumped or poured into the holding tank of the spraying vehicle, ready for application. County weed districts using different pesticides will often use designated storage tanks to hold specific pesticide formulations between applications.

The spraying vehicle consists of a holding tank secured to a flat bed or pick-up truck, and hoses, nozzles, and pumps to apply the insecticides and herbicides. The holding tank is typically 200 to 300 gallons in size. An operator positioned on the back of the truck directs the spray using a hand-held spray gun or nozzle. The holding tank or mixing tank may be rinsed with water prior to the next application. The rinse water is collected and stored for use in the next application.

Empty product containers are usually triple rinsed with water or rinsed by an equivalent method. The rinse waters are collected and put back into the system to be used for spraying. The rinsed containers are either recycled,

in the case of the plastic containers, or crushed or punctured and taken to a local landfill.

2.1.3 Seed Treaters/Grain Elevators

Seed treaters are involved in the cleaning and treating of seed. Fungicides are commonly used in these operations for smut and rot control. Insecticides are used on occasion to control specific insect problems such as wire worms. The seed is generally treated on a batch basis and depends upon the farmer's need. The pesticide is mixed in with the seed prior to delivery to the farmer. One type of mixing system uses a mixing drum, such as a panogen seed treater, where the chemical and seed are mixed prior to being loaded onto the delivery truck. Another process uses a chemical feed system in addition to the mixing tank. The chemical feed system consists of blending tanks and pumps, where the pesticides are pre-mixed and pre-measured prior to being added to the seed in the mixing tank.

Grain elevators are involved in the storage and marketing of grains such as wheat and barley. Insecticides in the form of sprays and fumigants are frequently used in these operations to control insects. Rodenticides and fungicides are also used on occasion. Insecticides are sprayed in empty bins prior to filling or are mixed with the grain as it is being placed in the elevator for storage. Fumigants are used in empty bins, or released on top of stored grain and allowed to diffuse through the grain mass. Rodenticides are generally used by placing the rodent bait in locations where it is most likely to be consumed.

2.2 PESTICIDE CHARACTERISTICS

The insecticides used by the applicators fall into a number of classes as determined by the active ingredient present in the product. Insecticides may work in several different ways. Most of the insecticides used by the aerial applicators function as systemic insecticides. These insecticides are applied to seeds, roots, or leaves of plants and are absorbed and translocated to the various plant parts in concentrations lethal to feeding insects. Fumigants are also typically insecticides; however, they are applied as a gas. There are fewer fumigants used than liquid or solid

insecticides primarily due to cost, hazards associated with application, and difficulty of use.

Herbicides function by inhibiting either the respiratory or the photosynthetic processes of selected plants. There are at least 17 classes of organic herbicides. In addition, a number of inorganic chemicals have been used as herbicides.

The fungicides used by the grain elevators and seed treaters are employed to protect grains from plant-pathogenic fungi. There are two types of fungicides, organic and systemic, and they function through one of three different methods: inhibition of energy production; interference with biosynthesis; or disruption of cell structure.

Table 1 lists information regarding some of the more commonly used pesticide products. This table is not all inclusive. The Montana Department of Agriculture or Montana DHES may be contacted for more information regarding these or other pesticides.

2.3 WASTE TYPES

There are five waste types that could be generated by pesticide applicators. These include (1) pesticide residues in holding tanks, mixing tanks, product containers, and filters; (2) rinse waters from holding tanks, mixing tanks, or containers; (3) empty containers; (4) adulterated, cancelled or contaminated formulations; and (5) contaminated material from spill cleanups. Each of these potential waste types is described in detail below.

(1) Pesticide Residues - These materials include:

- Unused pesticide remaining in a tank or container. This material may become a waste if it is not intended to be recycled into another spray mixture.
- Any material remaining in the bottom of a tank or container that cannot practically be removed by the usual methods of pouring or pumping. This residue is the material that adheres to the sides of the tank or container and remains after the pesticide has been poured or pumped out. This material may also become a waste if it is not intended to or cannot be put back into another spray mixture.

TABLE 1

COMMONLY USED PESTICIDES

INDUSTRY	CHEMICAL BRAND	ACTIVE COMPOUND	TYPE	RCRA WASTE NO.
Aerial applicators				
	Banvel	Dicamba	Herbicide	none
	2,4-D	2,4-Dichlorophenoxy acetic acid	Herbicide	U240 (Toxic)
	Glean	Chlorsulfuron	Herbicide	none
	Ally	Metsulfuron-methyl	Herbicide	none
	Sevin	1-naphthyl N-methyl carbamate	Insecticide	none
	Parathion	O,O-diethyl o-paranitrophenyl phosphothioate	Insecticide	P089 (Acute HW)
	Furadan	2,3-dihydro-2,2-dimethyl-7-benzofuranylmethylcarbamate	Insecticide	none
Ground Applicators				
	Roundup	Glyphosate	Herbicide	none
	Fargo	Triallate	Herbicide	none
	Tordan 22K	Picloram	Herbicide	none
	Arsenal	Imazapyr	Herbicide	none
	Spike	Tebuthiuron	Herbicide	none
	2,4-D	2,4-dichlorophenoxy acetic acid	Herbicide	U240 (Toxic)
	Banvel	Dicamba	Herbicide	none
	Malathion	S-[1,2-bis(ethoxycarbonyl)ethyl] O,O-dimethyl phosphorodithionate	Insecticide	none
	Arosurf	Ethyl oxalated iso-stearyl alcohol	Insecticide	none
	Baytex	Fenthion	Insecticide	none
	Scourge	Resnethris	Insecticide	none
	Strychnine	Strychnine	Rodenticide	P108 (Acute HW)
Seed Treaters/ Grain Elevators				
	Chloropic	Chloropicrin nitrochloromethane	Fumigant	none
	Vitavax	Carboxin	Fungicide	none
	Lindane	1 ,2 ,3 ,4 ,5 ,6 -hexachlorocyclohexane	Insecticide	U129 (Toxic)
	Warfarin	(3-(a-acetylbenzyl) 4-hydroxycoumarin	Rodenticide	U248, P001*
	Phostoxin/Fumi-toxin	Aluminum phosphide	Fumigant	P095 (Acute HW)

Toxic - Denotes a classification as a toxic waste
Acute HW - Denotes a classification as an acute hazardous waste

* This pesticide is classified as a toxic waste (U248) at concentrations of 0.3% or less or an acute

- Residues may also result from the tank filters, precipitate or rust from contaminated barrels.

(2) Rinse waters - These materials include:

- Rinse water from the rinsing of holding tanks or mixing tanks to remove residues. This material may become a waste if it is not intended to be put back into the process.

- Rinse water from the rinsing of containers to remove residues. This material may also become a waste if it is not intended to be put back into the process.

(3) Empty Containers - These materials include empty product containers or drums, including both plastic and metal.

(4) Adulterated, Cancelled or Contaminated Products - These materials include products for which certain uses or registrations have been cancelled or suspended, or those for which labels have been lost, or have been chemically altered due to freezing or prolonged storage.

(5) Spill Cleanup Residues - Any contaminated materials (soil, water, debris) from the cleanup of spills of pesticides to land or water.

Depending upon the hazardous characteristics exhibited by these pesticides and how these materials are managed, they may or may not be subject to Federal and State regulations.

3.0 HAZARDOUS WASTE REGULATIONS

3.1 FEDERAL HAZARDOUS WASTE REGULATIONS

The Federal regulations governing the management of hazardous wastes are specified under the Resource Conservation and Recovery Act (RCRA). The objectives of RCRA are to improve the management of wastes to protect the environment and human health, and to conserve valuable materials and energy resources. The RCRA regulations are specified in the Code of Federal Regulations (CFR), Title 40, Parts 260 through 272. The Environmental Protection Agency has the authority to administer the RCRA program.

3.2 STATE HAZARDOUS WASTE REGULATIONS

In the State of Montana, the Department of Health and Environmental Science (DHES) has been given the authority from EPA to develop and administer a hazardous waste management program. EPA requires that the development and administration of this state program is consistent with the federal standards set forth in the RCRA regulations. The State has developed hazardous waste management regulations under the Montana Hazardous Waste Act (MHWA) of October 1, 1985, which are specified in the Administrative Rules of Montana, Title 16, Chapter 44. This state program incorporates the Federal RCRA standards and includes additional requirements that were developed for the classification, generation, storage, treatment, and disposal of hazardous wastes.

3.3 APPLICABILITY OF FEDERAL AND STATE REGULATIONS TO PESTICIDE USERS

RCRA and the Montana Administrative Rules have established certain standards and criteria based on waste characteristics and management practices to determine whether or not a waste is considered a hazardous waste. If a waste is determined to be hazardous, specific regulations under RCRA and ARM apply to the management of that waste including storage, treatment, and disposal of the waste.

There are two ways a waste may be brought into the hazardous waste regulatory system: listing and identification through characteristics. These classifications are summarized below:

- Listed Wastes - A waste may be considered hazardous if it appears on any one of four lists of hazardous waste contained in the RCRA regulations. These wastes have been listed because they exhibit one or more the characteristics described below or contain any number of toxic constituents that have been shown to be harmfull to human health and the environment. The RCRA reguations list over 400 hazardous wastes, including wastes derived from non-specific sources (F Wastes), manufacturing processes (K Wastes), and discarded chemical products (P and U Wastes). These wastes can be found in 40 CFR 261, Subpart D. P and U wastes are listed in Appendix A of this handbook.

- Characteristic Wastes - Even though a waste does not appear on one of the above hazardous waste listes, it may be considered a hazardous waste if it exhibits any one of the following characteristics: ignitible, corrosive, reactive and EP toxic. These specific characteristics and criteria for identifying the RCRA characteristic wastes are described in detail in Appendix B of this handbook, and are referenced in 40 CFR 261, Subpart C.

3.3.3 Pesticide Wastes Subject to Regulation

Potential wastes generated from the use of certain pesticides may be subject to these hazardous waste regulations. To determine if a potential waste type is subject to regulation, the steps described below should be followed. Figure 1 provides a schematic guide for following these steps. Note that this procedure should be followed separately for each pesticide used.

STEP 1: DETERMINE IF THE PESTICIDE IS LISTED IN TABLE A-1 OR A-2

- For each pesticide used, determine if the chemical is listed in Appendix A, Tables A-1 or A-2. The pesticide will be listed by its trade or commercial name, its generic chemical name, or both names. For those pesticides that are listed in Table A-1 or A-2, the wastes generated from the use of that pesticide may be subject to regulation under RCRA and ARM. At this point, proceed to Step 2 for further determination of applicable regulations.

- For those pesticides that are not listed in Appendix A, Table A-1 or A-2, additional criteria based on waste characteristics need to be evaluated to determine what regulations may apply to the waste. At this point proceed to Step 1A.

STEP 1A: EVALUATE PESTICIDE FOR RCRA CHARACTERISTIC WASTES

- Although a particular pesticide may not be listed in Appendix A, Tables A-1 or A-2, there may be other characteristics or properties associated with the pesticide wastes that may warrant them subject to regulation. These wastes may be considered a "RCRA Characteristic Waste" because of certain properties of the

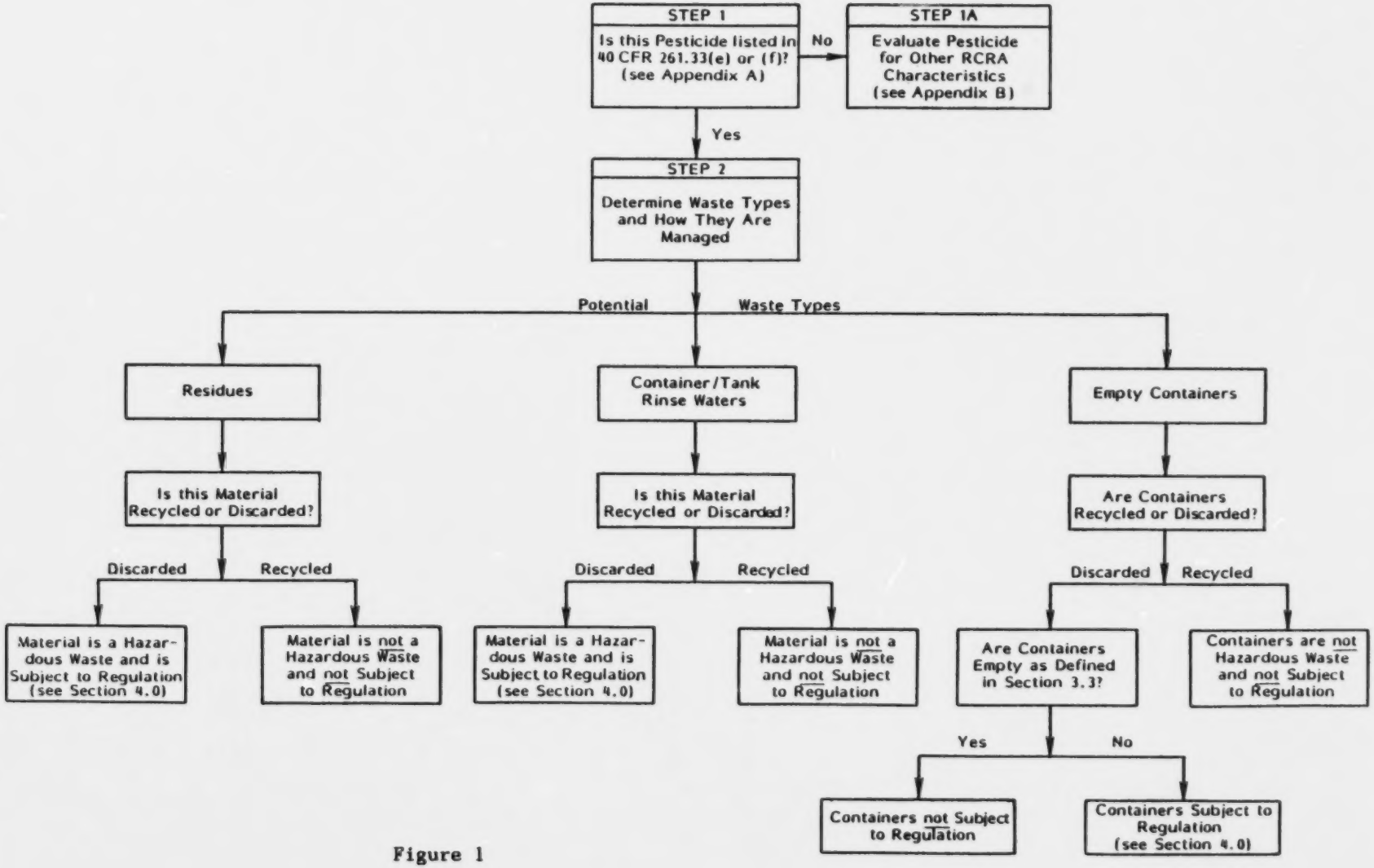
STEP 1
Is this Pesticide listed in 40 CFR 261.33(e) or (f)? (see Appendix A)
No
STEP 1A
Evaluate Pesticide for Other RCRA Characteristics (see Appendix B)
Yes
STEP 2
Determine Waste Types and How They Are Managed
Potential Waste Types
Residues
Container/Tank Rinse Waters
Empty Containers
Is this Material Recycled or Discarded?
Is this Material Recycled or Discarded?
Are Containers Recycled or Discarded?
Discarded
Recycled
Discarded
Recycled
Discarded
Recycled
Material is a Hazardous Waste and is Subject to Regulation (see Section 4.0)
Material is not a Hazardous Waste and not Subject to Regulation
Material is a Hazardous Waste and is Subject to Regulation (see Section 4.0)
Material is not a Hazardous Waste and not Subject to Regulation
Are Containers Empty as Defined in Section 3.3?
Containers are not Hazardous Waste and not Subject to Regulation
Yes
No
Containers not Subject to Regulation
Containers Subject to Regulation (see Section 4.0)

Figure 1

DETERMINING IF PESTICIDE WASTES
ARE SUBJECT TO REGULATION

material. These wastes can exhibit the characteristics of being ignitable, reactive, corrosive, or EP toxic. An explanation of these properties is summarized in Appendix B. If a waste is considered a RCRA Characteristic Waste, it is subject to hazardous waste management regulations. A careful evaluation of these pesticides, with the assistance of the Montana DHES or the Department of Agriculture, should be conducted to appropriately classify the potential pesticide wastes. Whether or not a particular pesticide in listed in Appendix A, Tables A-1 or A-2, or is considered a RCRA Characteristic Waste, EPA, the Montana DHES, and the Montana DOA recommend that these pesticides are appropriately managed in a manner consistent with the instructions on the pesticide container label to assure protection of human health and the environment.

STEP 2: DETERMINE WHAT WASTE TYPES MAY BE GENERATED FROM THE USE OF A PESTICIDE AND FOR EACH WASTE TYPE, DETERMINE HOW IT WILL BE MANAGED

- The three waste types that may potentially be generated from pesticide end-users and application services include pesticide residues remaining in the tanks or containers, container and tank rinse waters, and the empty containers. These waste types were summarized in Section 2.3. Depending upon how these specific waste types are managed, they may or may not be considered hazardous wastes under RCRA and ARM regulations. The criteria for determining whether or not these waste types are hazardous wastes are specified as follows:

RESIDUES

These residues <u>are not</u> hazardous wastes if <u>benefically used</u>. Examples of beneficial uses include:

- The residue remains in the container and the container is used to hold the same commercial chemical product it previously held.
- The residue is put back into the process to be reused. For example, in the case of the aerial applicators, the residues may be collected and reapplied on the fields.

These residues <u>are</u> hazardous wastes if <u>unuseable, discarded</u>, or intended to be discarded. Examples of discard include:

- A drum is sent to a drum reconditioner who reconditions the drum but disposes of any residue remaining in the drum.
- Any unused pesticide remaining in a container that cannot be used and is disposed by dumping onsite or offsite.

RINSE WATERS

These rinse waters are not hazardous wastes if they are being beneficially used. Examples of beneficial uses include:

- The rinse water is put back into the process to be reused. For example, in the case of land applicators, the rinse water may be collected, mixed with product, and reapplied during the next application. If necessary, rinse waters may be stored prior to reuse.

These rinse waters are hazardous wastes if they are unuseable, discarded or intended to be discarded. Examples of discard include:

- Disposing of the rinse water in a sewer drain, septic system, or on the ground.

EMPTY CONTAINERS

These containers are not hazardous wastes:

- Containers that are being reused or recycled. This includes containers that are returned to the vendor or distributor to be reused.

- Containers that are being discarded and are considered as empty as defined in the RCRA and ARM regulations. This definition of empty is explained below. For example, if a container held a pesticide that was listed in Table A-1, the container must be triple-rinsed before it is taken to a landfill.

These containers are hazardous wastes:

- Containers that are being discarded and are not empty under the RCRA and ARM definition. If considered as hazardous waste, these containers must be appropriately managed as such in accordance with RCRA and ARM regulations. An empty container is defined as follows:

- For those pesticides listed in Table A-1, that are considered as acute hazardous wastes:

  (i) The container has been triple rinsed using a solvent capable of removing the commercial chemical product, or

  (ii) The container has been cleaned by another method capable of achieving an equivalent removal as in (i), or

(iii) If a container has an inner liner preventing contact of the commercial chemical product with the container, the inner liner must be removed.

Note: The use of a solvent for rinsing containers as described in (i) is a common practice in non-agricultural industries or businesses. This method is not advised for the rinsing of pesticide containers if the rinse water is to be reused. The method commonly used for rinsing pesticide containers to obtain an equivalent result as in (i) is triple rinsing with ordinary tap water.

- For those pesticides listed in Table A-2, that are considered as <u>toxic wastes</u>:

  (i) All wastes have been removed that can practically be removed by methods of pouring, pumping, or aspirating, and

  (ii) No more than 2.5 centimeters (1 inch) of residue remains on the bottom of the container, or

  (iii) For containers less than or equal to 110 gallons in size: No more than 3 percent by weight of the total capacity of the container remains in the container

  For containers greater than 110 gallons in size: No more than 0.3 percent by weight of the total capacity of the container remains in the container.

<u>SPILL RESIDUES</u>

- Residues from any spills of hazardous chemicals become a hazardous waste when cleaned up, and must be disposed as a hazardous wate to a licensed TSDF.

In summary, these waste types are considered hazardous wastes under these RCRA and ARM regulations: pesticide residues and rinsewaters that are being discarded, containers that are being discarded without being properly emptied or rinsed, and collected debris from spill cleanups. These hazardous wastes are subject to specific regulations governing the generation, storage, treatment, and disposal of the wastes.

3.4 SPECIFIC REGULATIONS FOR FARMERS

Farmers disposing of waste pesticides that are considered as hazardous wastes based on criteria outlined in Section 3.3 (Step 1 and 1A), may be subject to regulations governing the management of pesticide wastes. The following conditions must **all** be met by the farmer to be **exempt** from the regulations governing the management of hazardous wastes:

- The farmer must be using the pesticide for his own use
- Empty pesticide containers must be triple rinsed as described in Section 3.3.3
- Pesticide residues are disposed on his own land in a manner consistent with the disposal instructions on the pesticide container label.

If any of these conditions are not met, the farmer must comply with the specific regulations governing the generation, storage, treatment, and disposal of hazardous wastes as described in Section 4.0.

4.0 HAZARDOUS WASTE GENERATOR REQUIREMENTS

4.1 BACKGROUND

The Environmental Protection Agency (EPA) and the Montana Department of Health and Environmental Science (DHES) classify generators of hazardous waste in three categories according to the amount of waste they generate. This classification was done in response to public attention to the fact the inappropriate management of even small quantities of hazardous waste can result in health or environmental problems. Depending on which generator category applies to a specific business, certain precautions or actions may be required in the management of hazardous wastes.

4.2 CATEGORIES OF GENERATORS

Businesses that generate 1,000 kilograms or more (2,200 pounds) per month of hazardous waste (or one kilogram per month of acute hazardous waste) must abide by all of the requirements of the law, and are not eligible for any exemptions. These are classified as large hazardous waste generators. Requirements for this category are not addressed in this manual.

Businesses generating between 100 kilograms and 1,000 kilograms (220 pounds to 2,200 pounds) per month of hazardous waste have been designated as **SMALL GENERATORS** and are allowed some special provisions. Finally, businesses that generate less than 100 kilograms (220 pounds) per month of hazardous waste are designated as **CONDITIONALLY EXEMPT GENERATORS**.

4.3 REQUIREMENTS FOR ALL GENERATORS

Each of the requirements that are described below apply to all generators, regardless of quantity. These are summaries of the Federal regulations and the State of Montana's regulations. The Federal regulations for hazardous waste generators are found in the Code of Federal Regulations, Title 40, Parts 261 and 262 (40 CFR 261 and 262) and are administered by EPA. The State of Montana's rules for hazardous waste generators are found in the Administrative Rules of Montana, Title 16, Chapter 44, and administered by DHES. Additional rules for the storage and disposal of pesticides are found in 4.10.101 through 4.10.1501 ARM of the Montana Pesticides Act.

It is important to note that the Federal laws apply nationwide. In some cases, requirements that have been added to the original Federal laws have not yet been adopted by the State of Montana. Even if the State has not yet adopted certain requirements from the Federal law, businesses are still required to abide by these Federal requirements. In addition, the State of Montana may have developed special requirements to address special problems within the state.

- All generators must determine which of the wastes they generate are hazardous. Sections 2.0 and 3.0 of this guidance manual contains descriptions of the hazardous wastes generated in a specific type of business. [40 CFR 262.11, ARM 16.44.402]

- All generators must segregate **listed** (F, K, P and U) hazardous wastes from non-hazardous wastes. Listed hazardous wastes are materials that have been specifically catalogued and are always considered hazardous. MIXING THESE WASTES WITH NON-HAZARDOUS WASTE WILL MAKE THE ENTIRE VOLUME A HAZARDOUS WASTE. Sections 2.0 and 3.0 of this guidance manual identified listed hazardous wastes that may be generated in your business.

- Under certain circumstances, generators may mix characteristic hazardous wastes and non-hazardous wastes if they are compatible (not reactive or explosive, etc.). The mixture is considered non-hazardous only if it no longer meets the characteristics of a hazardous waste. IF THE MIXTURE IS A WASTE EXHIBITING A HAZARDOUS CHARACTERISTIC, THE ENTIRE MIXTURE BECOMES A HAZARDOUS WASTE, AND THE SMALL GENERATOR MAY BECOME A LARGE GENERATOR AS A RESULT. Section 3.0 and Appendix B of this guidance manual identify the characteristics of hazardous waste that may apply to your business.

- In the event of a hazardous waste spill, all generators must treat spilled hazardous wastes, clean-up residues and containers as hazardous wastes.

- All generators must use containers that are compatible with the hazardous waste they are to contain. Containers should be sealed and free from leakage.

- All generators of hazardous waste must ensure their wastes are delivered to an off-site facility that is authorized by EPA or the state in which the receiving facility is located to receive municipal, industrial, or hazardous waste. The type of facility depends on the category of the generator.

- All generators must ensure that off-site shipments of hazardous waste are labeled, marked, and placarded according the U.S. Department of Transportation (DOT) requirements. This includes a U.S. DOT waste description, shipping name, hazard class, and identification number. Any questions about DOT shipping

requirements can be referred to the Montana State Department of Transportation. [40 CFR 262.30 to 262.33]

- A Hazardous Waste Manifest is required when shipping hazardous wastes off-site. The standard form is the U.S. EPA manifest form 8700-22, which is processed by DHES. [ARM 16.44.405]

4.4 REQUIREMENTS FOR CONDITIONALLY EXEMPT GENERATORS

A business qualifies as a Conditionally Exempt Generator if no more than 100 kilograms (220 pounds) per month of hazardous waste and no more than 1 kilogram (2.2 pounds) per month of acutely hazardous waste are generated. Acutely hazardous wastes are listed in Table A-1 of Appendix A. No more than 1,000 kilograms (2,200 pounds) of hazardous waste can be accumulated on-site or on your property. There is no time limit for this accumulation, as long as the 1,000 kilogram storage limit is not exceeded.

As a rule of thumb, a 55-gallon drum of hazardous waste is about 200 kilograms (440 pounds). This means that the business must generate less than one-half of a 55-gallon drum of hazardous waste per month or accumulate no more than five 55-gallon drums at any one time.

As long as the above two conditions are maintained, a business falls into a category called "conditionally exempt". The business must still meet all of the requirements presented in Section 4.3 of this manual, but it is conditionally exempt from other requirements for generators of hazardous wastes.

Examples of how a business can lose conditionally exempt status are:

- The business generates less than 100 kilograms per month eleven months out of the year, and more than 100 kilograms in the twelfth month.
- The amount of hazardous waste accumulated by a business exceeds 1,000 kilograms.

If hazardous waste management practices result in a business losing its conditionally exempt status, all requirements for Small Generators must be met. These are listed in Section 4.5 of this manual.

As long as the business meets the requirements of this section, hazardous waste may be disposed at a hazardous waste facility, or a licensed Class II sanitary landfill or other facility approved by the State of Montana for industrial or municipal wastes on the condition that the operating authority of the landfill accepts the waste.

4.5 REQUIREMENTS FOR SMALL GENERATORS

Small generators are businesses generating between 100 and 1,000 kilograms (220 to 2,200 pounds) of hazardous waste per month. If a business falls in this category, it also may not generate more than 1 kilogram (2.2 pounds) per month of acutely hazardous waste (see Appendix A, Table A-1 and Section 3.3), and may not accumulate on-site more than 6,000 kilograms of hazardous waste. Businesses in this category must meet the following requirements:

Identification

- Small generators must have an EPA identification number. This twelve-digit number is part of a national data base to track hazardous waste activities for generators, transporters, disposal facilities, etc. In order to obtain an EPA identification number, contact the State of Montana Department of Health and Environmental Sciences and request a copy of EPA form 8700-12 "Notification of Hazardous Waste Activity". [40 CFR 262.12, ARM 16.44.403]

Accumulation Time Limit

- Storage of hazardous waste on the generator's property must not exceed 180 days, except if the waste must be transported greater than 200 miles, in which case the waste may be stored for up to 270 days. Hazardous waste may only be transported to authorized treatment, storage, or disposal facilities (TSDF). DHES can assist businesses with locating an authorized facility. This provision is designed to allow Small Generators to accumulate enough waste to justify making a shipment. [40 CFR 262.34 (e-f), ARM 16.44.415]

- Containers or drums must be labeled and dated on the first day that any hazardous waste is placed in them. From this date, each individual container may hold waste for a maximum of 180 days (or 270 days, depending on shipping distance) before it must be shipped to a TSDF. Wastes may not be transferred from one container to another to extend the allowable accumulation time. [40 CFR 262.34, ARM 16.44.415]

- Small Generators who reach the 6,000 kilogram (13,200 pounds) accumulation limit for total hazardous wastes on site must ship the waste to a TSDF in accordance with the rules in this section.

On-site Treatment

- Under certain circumstances, Small Generators may treat hazardous wastes on their property without a special permit only if the treatment takes place within the 180 day (or 270 day) time limit for storage and only if all container and tank storage requirements presented below are followed, and all necessary precautions taken to prevent spills or accidents. On-site treatment should be discussed with Montana DHES prior to commencement of operations to ensure that all applicable regulations have been followed.

On-site Disposal

- No Small Generator may dispose of hazardous wastes on their property without a Disposal Permit issued by EPA or DHES.

Shipment

- Small Generators must ship wastes to a hazardous waste TSDF. Wastes must be shipped using a manifest, and all manifest and waste analysis records must be maintained for at least three years. Care should be taken in selecting a waste hauler and a TSDF since the generator is **still responsible** for the proper management of the waste, even after it leaves his property. The generator should ensure that all hazardous waste haulers and TSDFs have EPA ID numbers. [40 CFR 262.40, 262.44, ARM 16.44.416]

Container Storage

If hazardous wastes are stored in containers (such as drums) the generator must:

- Clearly label each container with the words "Hazardous Waste" and the date on which waste storage begins in that container. Labels can be obtained from DHES.

- Make sure that hazardous waste is not stored in a container that will be corroded, ruptured, or damaged in any way by that waste. [40 CFR 265.172]

- Containers should be closed except when being filled or emptied. [40 CFR 265.173]

- Inspect containers weekly. Keep containers in good shape and replace any that are leaking. [40 CFR 265.174]

- Transfer hazardous waste from leaking containers to different containers. Label the new containers with the start date from the original container. [40 CFR 265.171]

- Never store wastes in the same container if they are non-compatible (reactive, explosive, etc.). [40 CFR 265.177]

- Containers of ignitable or reactive wastes must be stored as far as possible from the facility property line to ensure a buffer zone.

Tank Storage

If hazardous wastes are stored in tanks the generator must: [40 CFR 265.201]

- Inspect tanks weekly and ensure that they are not leaking. Inspect monitoring or gauging systems each operating day.

- Make sure that hazardous waste is not stored in a tank that will be corroded, ruptured, or damaged in any way by that waste.

- Keep the tank covered or maintain at least two feet of freeboard (space at the top of the tank) in uncovered tanks.

- Provide a means to cut off or divert flow of waste into the tank in the event of a problem.

- Abide by National Fire Protection Association requirements for tanks containing ignitable or reactive wastes. These requirements specify the distances needed to establish safe buffer zones for various liquids based on combustible and flammable characteristics. The local fire department or DHES can assist with this.

Emergency Response

- At least one employee must be on hand or on call at all times in case of an emergency, and to be responsible for coordinating emergency response measures. This person is the emergency coordinator and he or his designee must respond to any emergencies.

- Small Generators must post the following information next to the telephone:

  - Name and telephone number of the emergency coordinator

  - Location of the fire extinguishers, spill control equipment, and fire alarm

  - Telephone number of the fire department, unless the facility is equipped with a direct alarm

- Small Generators must ensure that all employees are thoroughly familiar with the waste handling and emergency procedures relevant to their responsibilities.

- Emergencies that require a response include the following:

  - In the event of a fire, call the fire department or attempt extinguish the fire using a fire extinguisher

  - In the event of a spill, contain the flow of hazardous waste to the extent possible, and as soon as is practicable, clean up the hazardous waste and any contaminated materials or soil

- In the event of a fire, explosion, or other release that could threaten human health outside the facility or when the generator has knowledge that a spill has reached surface waters, the generator must immediately notify <u>both</u> the Montana DHES Hazardous Materials Spills Program (1-406-444-6911) and the National Response Center (1-800-424-8802). The report must include the following:

  - The generator's name, address, and EPA identification number

  - Date, time, and type of accident (e.g., spill, fire)

  - Quantity and type of hazardous waste involved in the incident

  - Extent of injuries, if any

  - Estimated quantity and disposition of recovered materials, if any

5.0 WASTE MANAGEMENT PLANS

This section of the manual provides waste management strategies currently available to the pesticide applicators. Waste management strategies are focused on minimizing the amount of hazardous waste that could be generated from these operations. There are several advantages of hazardous waste minimization. These include:

- Reducing the high costs associated with the management and disposal of hazardous wastes.
- Reducing the liability risks associated with the management and disposal of hazardous wastes.
- Reducing the problems arising from restrictions on land disposal of certain hazardous wastes.
- Minimizing the time and resources required to comply with the hazardous waste management regulations.

Waste minimization practices can include product substitution, process modifications, waste treatment, good housekeeping practices, and recycling and reuse. The selection of a particular waste minimization practice is based upon the industry or business operations, types of wastes generated, and their individual needs and problems.

For pesticide applicators, waste minimization techniques have been practiced for the past several years. In these operations, the pesticide residues and container rinse waters are being recycled or reused as raw materials in new pesticide mixtures. This practice of reusing these materials helps to reduce the amount of pesticide product that is required. Another advantage of reusing these materials is that they are not considered to be as hazardous wastes and, therefore, are not subject to the RCRA and ARM hazardous waste management regulations.

The waste minimization practices described in the following sections have been based upon methods currently used by the majority of pesticide applicators and are consistent with current RCRA and ARM regulations. The

discussion provides guidance for those unfamiliar with the current practices of reusing the pesticide residue and rinse water.

5.1 UNUSED CHEMICAL PRODUCTS

Waste management options for unused chemical product in a tank or container include:

- Reuse - The unused pesticides can be collected or stored until they can be used for a particular application. Storage of the pesticide can be in the spray tank, or placed in a container with the contents clearly labelled. For example, in the case of an aerial applicator, if pesticide remains in the holding tank of the airplane after an application and a different pesticide is required for the next application, then the unused pesticide could be collected in a container and stored for a future application that requires that type of pesticide.

- Disposal - If an unused pesticide cannot be applied to the land or to the vendor, the unused pesticide may require disposal. In this case, the pesticide may become a hazardous waste and must be managed according to the appropriate hazardous waste management regulations as outlined in Sections 3.0 and 4.0 of this manual. To minimize the amount of hazardous waste that must be disposed, the specific unused pesticide should not be mixed with other pesticide wastes.

- Product Purchasing - The need for unused pesticide disposal may be avoided by ordering the specific pesticide on an "as needed" basis in the correct quantities required.

- Cancelled or Unopened Products - Cancelled, suspended, out-of-date, or unused pesticide products may be returned to the vendor or distributor. If the container has been opened, it may not be returned; pesticides in the container should be treated as hazardous wastes.

5.2 PESTICIDE RESIDUE/RINSE WATER

Waste management options for rinse waters in a tank or container include:

- Reuse - The rinse waters can be stored and reused for subsequent applications.

- Liquid Disposal - In some instances, rinse water cannot be reused and may require disposal. In this case, the rinse water may become a hazardous waste and must to be managed according to the appropriate hazardous waste management regulations as outlined in Sections 3.0 and 4.0 of this manual. To minimize the amount of hazardous waste that

could be generated, rinse waters should not be mixed with other pesticide wastes.

- Container Disposal - If the pesticide residues are not removed from the containers, such that the containers are not considered empty, then the residue and the container may be considered a hazardous waste and must be managed according to the appropriate hazardous waste management regulations. Other pesticide wastes should not be mixed in with the residue in the containers. The management of empty containers is described in the next section.

5.3 EMPTY CONTAINERS

Waste management options for empty containers include recycling, reuse, or disposal. In most of these cases, the containers need to be thoroughly rinsed prior to reuse or disposal. The recommended method for cleaning the containers is triple rinsing with water. Triple rinsing means that a container is rinsed three times and the rinse water from each step is removed from the container. Equivalent rinsing methods, such as a pump spray method, can also be used.

The waste management options for empty containers are discussed below:

- Recycling - Some containers may be returned to the vendor or distributor so that they can be reused. Depending upon the type of pesticide previously stored in the container, the vendor may require that the containers be rinsed by the pesticide user prior to return. Generally, only plastic containers are recycled. Containers that are recycled in this manner are not considered hazardous wastes and, therefore, are not subject to regulation.

- Disposal - If a container has been adequately rinsed, it may be disposed at a licensed Class II sanitary landfill. In some cases, the landfill authority may require that the containers be punctured or crushed prior to acceptance. Some cities or counties may have restrictions on the type, size, or number of containers that can be accepted at the landfill.

  Note that some containers may be required to be disposed as hazardous wastes. For those containers that held pesticides that are listed as acute hazardous wastes or toxic wastes, specific criteria have been established to determine if the empty containers are considered as hazardous wastes or not (Refer to Appendix A, Table A-1 and Section 3.3). If not considered as hazardous wastes, the container can be disposed at a licensed Class II sanitary landfill. If considered a hazardous waste, the container must be disposed at a licensed facility specifically designed to handle hazardous wastes. This disposal option

as a hazardous waste is expensive in terms of disposal costs and resources required to comply with the necessary regulations.

5.4 DEBRIS FROM SPILL CLEANUP

Debris from spill cleanups of hazardous pesticides, including soil, water and contaminated debris, should be handled as hazardous waste. In order to avoid the necessary steps involved in cleaning up and disposing of these materials, good housekeeping practices should be followed to prevent spills from occurring. These practices can include:

- Performing pesticide mixing activities in paved areas over containers where liquids may be collected and reused.
- Rinsing spray equipment over the containers in which rinse water will be stored or in an area where liquids may be collected, or placed in appropriate containers.
- Storing partially full, empty unrinsed and empty rinsed containers in paved or protected areas where any liquids or residues would not reach the soil, or a surface water.

Table A-2 (cont'd)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
Generic:		
F001	The following spent halogenated solvents used in degreasing: Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F002	The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F003	The following spent non-halogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I)*
F004	The following spent non-halogenated solvents: Cresols and cresylic acid, and nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F005	The following spent non-halogenated solvents: Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I,T)
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.	(T)
F019	Wastewater treatment sludges from the chemical conversion coating of aluminum.	(T)
F007	Spent cyanide plating bath solutions from electroplating operations.	(R, T)
F008	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.	(R, T)
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.	(R, T)
F010	Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.	(R, T)
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.	(R, T)
F012	Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process.	(T)
F024	Wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes from the production of chlorinated aliphatic hydrocarbons, having carbon content from one to five, utilizing free radical catalyzed processes. [This listing does not include light ends, spent filters and filter aids, spent desiccants, wastewater, wastewater treatment sludges, spent catalysts, and wastes listed in Section 261.32.].	(T)
F028	Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027.	(T)

Table A-2 (cont'd)

Hazardous waste No.	Chemical Abstracts No.	Substance
U328	95-53-4	o-Toluidine
U353	106-49-0	p-Toluidine
U222	636-21-5	o-Toluidine hydrochloride
U011	61-82-5	1H-1,2,4-Triazol-3-amine
U226	71-55-6	1,1,1-Trichloroethane
U227	79-00-5	1,1,2-Trichloroethane
U228	79-01-6	Trichloroethylene
U121	75-69-4	Trichloromonofluoromethane
* U230	95-95-4	2,4,5-Trichlorophenol
* U231	88-06-2	2,4,6-Trichlorophenol
U234	99-35-4	sym-Trinitrobenzene (R,T)
U182	123-63-7	1,3,5-Trioxane, 2,4,6-trimethyl-
U235	126-72-7	Tris(2,3-dibromopropyl) phosphate
U236	72-57-1	Trypan blue
U237	66-75-1	Uracil mustard
U176	759-73-9	Urea, N-ethyl-N-nitroso-
U177	684-93-5	Urea, N-methyl-N-nitroso-
U043	75-01-4	Vinyl chloride
U248	81-81-2	Warfarin, when present at concentrations of 0.3% or less
U239	1330-20-7	Xylene (I)
U200	50-55-5	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl) oxy]-, methyl ester
U249	1314-84-7	Zinc phosphide, when present at concentrations of 10% or less.

[1]CAS Number given for parent compound only.

* These wastes are also designated as F027 wastes. See Table A-1.

Table A-2 (cont'd)

Hazardous waste No.	Chemical Abstracts No.	Substance
U078	75-35-4	Ethene, 1,1-dichloro-
U079	156-60-5	Ethene, 1,2-dichloro-, (E)-
U210	127-18-4	Ethene, tetrachloro-
U228	79-01-6	Ethene, trichloro
U112	141-78-6	Ethyl acetate (I)
U113	140-88-5	Ethyl acrylate (I)
U238	51-79-6	Ethyl carbamate
U038	510-15-6	Ethyl 4,4'-dichlorobenzilate
U114	111-54-6	Ethylenebis(dithiocarbamic acid), salts and esters
U067	106-93-4	Etylene dibromide
U077	107-06-2	Ethylene dichloride
U359	110-80-5	Ethylene glycol monoethyl ether
U115	75-21-8	Ethylene oxide (I,T)
U116	96-45-7	Ethylene thiourea
U117	60-29-7	Ethyl ether (I)
U076	75-34-3	Ethylidene dichloride
U118	97-63-2	Ethyl methacrylate
U119	62-50-0	Ethylmethanesulfonate
U120	206-44-0	Fluoranthene
U122	50-00-0	Formaldehyde
U123	64-18-6	Formic acid (C,T)
U124	110-00-9	Furan (I)
U125	98-01-1	2-Furancarboxaldehyde (I)
U147	108-31-6	2,5-Furandione
U213	109-99-9	Furan, tetrahydro- (I)
U125	98-01-1	Furfural (I)
U124	110-00-9	Furfuran (I)
U206	18883-66-4	D-Glucopyranose, 2-deoxy-2(3-methyl-3-nitrosoureido)-
U126	765-34-4	Glycidylaldehyde
U163	70-25-7	Guanidine, N-methyl-N'-nitro-N-nitroso-
U127	18-74-1	Hexachlorobenzene
U128	87-68-3	Hexachlorobutadiene
U129	58-89-9	Hexachlorocyclohexane (gamma isomer)
U130	77-47-4	Hexachlorocyclopentadiene
U131	67-72-1	Hexachloroethane
U132	70-30-4	Hexachlorophene
U243	1888-71-7	Hexachloropropene
U133	302-01-2	Hydrazine (R,T)
U086	1615-80-1	Hydrazine, 1,2-diethyl-
U098	57-14-7	Hydrazine, 1,1-dimethyl-
U099	540-73-8	Hydrazine, 1,2-dimethyl-
U109	122-66-7	Hydrazine, 1,2-diphenyl-
U134	7664-39-3	Hydrofluoric acid (C,T)
U134	7664-39-3	Hydrogen fluoride (C,T)
U135	7783-06-4	Hydrogen sulfide
U096	80-15-9	Hydroperoxide, 1-methyl-1-phenylethyl- (R)
U136	75-60-5	Hydroxydimethylarsine oxide
U116	96-45-7	2-Imidazolidinethione
U137	193-39-5	Indeno[1,2,3-cd]pyrene
U139	9004-66-4	Iron dextran
U190	85-44-9	1,3-Isobenzofurandione
U140	78-83-1	Isobutyl alcohol (I,T)
U141	120-58-1	Isosafrole
U142	143-50-0	Kepone
U143	303-34-4	Lasiocarpine
U144	301-04-2	Lead acetate
U146	1335-32-6	Lead, bis(acetato-O)tetrahydroxytri-
U145	7446-27-7	Lead phosphate
U146	1335-32-6	Lead subacetate
U129	58-89-9	Lindane
U147	108-31-6	Maleic anhydride
U148	123-33-1	Maleic hydrazide
U149	109-77-3	Malononitrile
U150	148-82-3	Melphalan
U151	7439-97-6	Mercury
U152	126-98-7	Methacrylonitrile (I,T)
U092	124-40-3	Methanamine, N-methyl- (I)
U029	74-83-9	Methane, bromo-
U045	74-87-3	Methane, chloro-(I,T)
U046	107-30-2	Methane, chloromethoxy-
U068	74-95-3	Methane, dibromo-
U080	75-09-2	Methane, dichloro-
U075	75-71-8	Methane, dichlorodifluoro-
U138	74-88-4	Methane, iodo-
U119	62-50-0	Methanesulfonic acid, ethyl ester
U211	56-23-5	Methane, tetrachloro-
U153	74-93-1	Methanethiol (I,T)
U225	75-25-2	Methane, tribromo-
U044	67-66-3	Methane, trichloro-
U121	75-69-4	Methane, trichlorofluoro-
U123	64-18-6	Methanoic acid (C,T)
U154	67-56-1	Methanol (I)
U155	91-80-5	Methapyrilene
U142	143-50-0	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one,1,1a,3,3a,4,5,5,5a,5b,6-decachloro-octahydro-
U247	72-43-5	Methoxychlor
U154	67-56-1	Methyl alcohol (I)
U029	74-83-9	Methyl bromide
U186	504-60-9	1-Methylbutadiene (I)
U045	74-87-3	Methyl chloride (I,T)
U156	79-22-1	Methylchlorocarbonate (I,T)
U226	71-55-6	Methylchloroform
U157	56-49-5	3-Methylcholanthrene
U158	101-14-4	4,4'-Methylenebis(2-chloroaniline)
U068	74-95-3	Methylene bromide
U080	75-09-2	Methylene chloride
U159	78-93-3	Methyl ethyl ketone (MEK)(I,T)
U160	1338-23-4	Methyl ethyl ketone peroxide (R,T)
U138	74-88-4	Methyl iodide
U161	108-10-1	Methyl isobutyl ketone (I)
U162	80-62-6	Methyl methacrylate (I,T)
U163	70-25-7	N-Methyl-N'-nitro-N-nitrosoguanidine
U161	108-10-1	4-Methyl-2-pentanone (I)
U164	56-04-2	Methylthiouracil
U010	50-07-7	Mitomycin C
U059	20830-81-3	5,12-Naphthacenedione, (8S-cis)-8-acetyl-10-[(3-amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-
U165	91-20-3	Naphthalene
U047	91-58-7	Naphthalene, 2-chloro-
U166	130-15-4	1,4-Naphthalenedione
U236	72-57-1	2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'-dimethyl-(1,1'-biphenyl)-4,4'diyl)]-bis (azo) bis(5-amino-4-hydroxy)-, tetrasodium salt

Table A-2 (cont'd)

Hazardous waste No.	Chemical Abstracts No.	Substance
U166	130-15-4	1,4-Naphthoquinone
U167	134-32-7	alpha-Naphthylamine
U168	91-59-8	beta-Naphthylamine
U026	494-03-1	2-Naphthylamine, N,N'-bis(2-chloroethyl)-
U167	134-32-7	1-Naphthylenamine
U168	91-59-8	2-Naphthylenamine
U217	10102-45-1	Nitric acid, thallium(1+) salt
U169	98-95-3	Nitrobenzene (I,T)
U170	100-02-7	p-Nitrophenol
U171	79-46-9	2-Nitropropane (I,T)
U172	924-16-3	N-Nitrosodi-n-butylamine
U173	1116-54-7	N-Nitrosodiethanolamine
U174	55-18-5	N-Nitrosodiethylamine
U176	759-73-9	N-Nitroso-N-ethylurea
U177	684-93-5	N-Nitroso-N-methylurea
U178	615-53-2	N-Nitroso-N-methylurethane
U179	100-75-4	N-Nitrosopiperidine
U180	930-55-2	N-Nitrosopyrrolidine
U181	99-55-8	5-Nitro-o-toluidine
U193	1120-71-4	1,2-Oxathiolane, 2,2-dioxide
U058	50-18-0	2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide
U115	75-21-8	Oxirane (I,T)
U126	765-34-4	Oxiranecarboxyaldehyde
U041	106-89-8	Oxirane, (chloromethyl)-
U182	123-63-7	Paraldehyde
U183	608-93-5	Pentachlorobenzene
U184	76-01-7	Pentachloroethane
U185	82-68-8	Pentachloronitrobenzene (PCNB)
U242	87-86-5	Pentachlorophenol
U186	504-60-9	1,3-Pentadiene (I)
U187	62-44-2	Phenacetin
U188	108-95-2	Phenol
U048	95-57-8	Phenol, 2-chloro-
U039	59-50-7	Phenol, 4-chloro-3-methyl-
U081	120-83-2	Phenol, 2,4-dichloro-
U082	87-65-0	Phenol, 2,6-dichloro-
U089	56-53-1	Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-,(E)-
U101	105-67-9	Phenol, 2,4-dimethyl-
U052	1319-77-3	Phenol, methyl-
U132	70-30-4	Phenol, 2,2'-methylenebis[3,4,6-trichloro-
U170	100-02-7	Phenol, 4-nitro-
* U242	87-86-5	Phenol, pentachloro-
* U212	58-90-2	Phenol, 2,3,4,6-tetrachloro-
* U230	95-94-4	Phenol, 2,4,5-trichloro-
U231	88-06-2	Phenol, 2,4,6-trichloro-
U150	148-82-3	L-Phenylalanine, 4-[bis(2-chloroethyl) amino]-
U145	7446-27-7	Phosphoric acid, lead salt
U087	3288-58-2	Phosphorodithioic acid, O,O-diethyl-, S-methyl ester
U189	108-95-2	Phosphorus sulfide (R)
U190	85-44-9	Phthalic anhydride
U191	109-06-8	2-Picoline
U179	100-75-4	Piperidine, 1-nitroso-
U192	23950-58-5	Pronamide
U194	107-10-8	1-Propanamine (I,T)
U111	621-64-7	1-Propanamine, N-nitroso-N-propyl-
U110	142-84-7	1-Propanamine, N-propyl- (I)

Hazardous waste No.	Chemical Abstracts No.	Substance
U066	96-12-8	Propane, 1,2-dibromo-3-chloro-
U149	109-77-3	Propanedinitrile
U171	79-46-9	Propane, 2-nitro- (I,T)
U027	39638-32-9	Propane, 2,2'-oxybis[2-chloro-
U193	1120-71-4	1,3-Propane sultone
U235	126-72-7	1-Propanol, 2,3-dibromo-, phosphate (3:1)
U140	78-83-1	1-Propanol, 2-methyl- (I,T)
U002	67-64-1	2-Propanone (I)
U084	542-75-6	1-Propene, 1,3-dichloro-
U152	126-98-7	2-Propenenitrile, 2-methyl- (I,T)
U007	79-06-1	2-Propenamide
U243	1888-71-7	1-Propene, hexachloro-
U009	107-13-1	2-Propenenitrile
U008	79-10-7	2-Propenoic acid (I)
U113	140-88-5	2-Propenoic acid, ethyl ester (I)
U118	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester
U162	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester (I,T)
*U233	93-72-1	Propionic acid, 2-(2,4,5-trichlorophenoxy)-
U194	107-10-8	n-Propylamine (I,T)
U083	78-87-5	Propylene dichloride
U148	123-33-1	3,6-Pyridazinedione, 1,2-dihydro
U196	110-86-1	Pyridine
U191	109-06-8	Pyridine, 2-methyl-
U237	66-75-1	2,4(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-
U164	56-04-2	4-(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U180	930-55-2	Pyrrolidine, 1-nitroso-
U200	50-55-5	Reserpine
U201	108-46-3	Resorcinol
U202	81-07-2	Saccharin and salts
U203	94-59-7	Safrole
U204	7783-00-8	Selenious acid
U204	7783-00-8	Selenium dioxide
U205	7446-34-6	Selenium sulfide (R,T)
U015	115-02-6	L-Serine, diazoacetate (ester)
* U233	93-72-1	Silvex
U206	18883-66-4	Streptozotocin
U103	77-78-1	Sulfuric acid, dimethyl ester
U189	1314-80-3	Sulfur phosphide (R)
*U232	93-76-5	2,4,5-T
U207	95-94-3	1,2,4,5-Tetrachlorobenzene
U208	630-20-6	1,1,1,2-Tetrachloroethane
U209	79-34-5	1,1,2,2-Tetrachloroethane
U210	127-18-4	Tetrachloroethylene
* U212	58-90-2	2,3,4,6-Tetrachlorophenol
U213	109-99-9	Tetrahydrofuran (I)
U214	15843-14-8	Thallium(I) acetate
U215	6533-73-9	Thallium(I) carbonate
U216	7791-12-0	Thallium chloride
U217	10102-45-1	Thallium(I) nitrate
U218	62-55-5	Thioacetamide
U153	74-93-1	Thiomethanol (I,T)
U244	137-26-8	Thioperoxydicarbonic diamide, tetramethyl-
U219	62-56-6	Thiourea
U244	137-26-8	Thiuram
U220	108-88-3	Toluene
U221	25376-45-8	Toluenediamine
U223	26471-62-5	Toluene diisocyanate (R,T)

Table A-2 (cont'd)

Hazardous waste No.	Chemical Abstracts No.	Substance
U143	303-34-4	2-Butenoic acid, 2-methyl-, 7-[(2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy)methyl]-2,3,5,7a-tetrahydro-1-pyrrolizin-1-yl ester, [1S-[1alpha(Z),7(2S,3R),7aalpha]]-
U031	71-36-3	n-Butyl alchohol (I)
U136	75-60-5	Cacodylic acid
U032	13765-19-0	Calcium chromate
U238	51-79-6	Carbamic acid, ethyl ester
U178	615-53-2	Carbamic acid, methylnitroso-, ethyl ester
U097	79-44-7	Carbamic chloride, dimethyl-
U114	[1]111-54-6	Carbamodithioic acid, 1,2-ethanediylbis-, salts and esters
U062	2303-16-4	Carbamothioic acid, bis(1-methylethyl)-S-(2,3-dichloro-2-propenyl) ester
U215	6533-73-9	Carbonic acid, dithallium(1+) salt
U033	353-50-4	Carbonic difluoride
U156	79-22-1	Carbonochloridic acid, methyl ester (I,T)
U033	353-50-4	Carbon oxyfluoride (R,T)
U211	56-23-5	Carbon tetrachloride
U034	75-87-6	Chloral
U035	305-03-3	Chlorambucil
U036	12789-03-6	Chlordane
U026	494-03-1	Chlornaphazine
U037	108-90-7	Chlorobenzene
U039	59-50-7	p-Chloro-m-cresol
U041	106-89-8	1-Chloro-2,3-epoxypropane
U042	110-75-8	2-Chloroethyl vinyl ether
U044	67-66-3	Chloroform
U046	107-30-2	Chloromethyl methyl ether
U047	91-58-7	beta-Chloronaphthalene
U048	95-57-8	o-Chlorophenol
U049	3165-93-3	4-Chloro-o-toluidine, hydrochloride
U032	13765-19-0	Chromic acid, calcium salt
U050	218-01-9	Chrysene
U051	8021-39-4	Creosote
U052	1319-77-3	Cresols (Cresylic acid)
U053	4170-30-3	Crotonaldehyde
U055	98-82-8	Cumene (I)
U246	506-68-3	Cyanogen bromide
U197	106-51-4	2,5-Cyclohexadiene-1,4-dione
U056	110-82-7	Cyclohexane (I)
U057	108-94-1	Cyclohexanone (I)
U130	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-
U058	50-18-0	Cyclophosphamide
U240	[1]94-75-7	2,4-D, salts and esters
U059	20830-81-3	Daunomycin
U060	72-54-8	DDD
U061	50-29-3	DDT
U062	2303-16-4	Diallate
U063	53-70-3	Dibenz[a,h]anthracene
U064	189-55-9	Dibenzo[a,i]pyrene
U066	96-12-8	1,2-Dibromo-3-chloropropane
U069	84-74-2	Dibutyl phthalate
U070	95-50-1	o-Dichlorobenzene
U071	541-73-1	m-Dichlorobenzene
U072	106-46-7	p-Dichlorobenzene
U073	91-94-1	3,3'-Dichlorobenzidine
U074	764-41-0	1,4-Dichloro-2-butene (I,T)

Hazardous waste No.	Chemical Abstracts No.	Substance
U075	75-71-8	Dichlorodifluoromethane
U078	75-35-4	1,1-Dichloroethylene
U079	156-60-5	1,2-Dichloroethylene
U025	111-44-1	Dichloroethyl ether
U081	120-83-2	2,4-Dichlorophenol
U082	87-65-0	2,6-Dichlorophenol
U240	[1]94-75-7	2,4-Dichlorophenoxyacetic acid, salts and esters
U083	78-87-5	1,2-Dichloropropane
U084	542-75-6	1,3-Dichloropropene
U085	1464-53-5	1,2:3,4-Diepoxybutane (I,T)
U108	123-91-1	1,4-Diethyleneoxide
U086	1615-80-1	N,N-Diethylhydrazine
U087	3288-58-2	O,O-Diethyl-S-methyl-dithiophosphate
U088	84-66-2	Diethyl phthalate
U089	56-53-1	Diethylstilbestrol
U090	94-58-6	Dihydrosafrole
U091	119-90-4	3,3'-Dimethoxybenzidine
U092	124-40-3	Dimethylamine (I)
U093	60-11-7	Dimethylaminoazobenzene
U094	57-97-6	7,12-Dimethylbenz[a]anthracene
U095	119-93-7	3,3'-Dimethylbenzidine
U096	80-15-9	alpha,alpha-Dimethylbenzylhydroperoxide (R)
U097	79-44-7	Dimethylcarbamoyl chloride
U098	57-14-7	1,1-Dimethylhydrazine
U099	540-73-8	1,2-Dimethylhydrazine
U101	105-67-9	2,4-Dimethylphenol
U102	131-11-3	Dimethyl phthalate
U103	77-78-1	Dimethyl sulfate
U105	121-14-2	2,4-Dinitrotoluene
U106	606-20-2	2,6-Dinitrotoluene
U107	117-84-0	Di-n-octyl phthalate
U108	123-91-1	1,4-Dioxane
U109	122-66-7	1,2-Diphenylhydrazine
U110	142-84-7	Dipropylamine (I)
U111	621-64-7	Di-n-propylnitrosamine
U001	75-07-0	Ethanal (I)
U174	55-18-5	Ethanamine, N-ethyl-N-nitroso-
U155	91-80-5	1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-
U067	106-93-4	Ethane, 1,2-dibromo-
U076	75-34-3	Ethane, 1,1-dichloro-
U077	107-06-2	Ethane, 1,2-dichloro-
U131	67-72-1	Ethane, hexachloro-
U024	111-91-1	Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-
U117	60-29-7	Ethane, 1,1-oxybis- (I)
U025	111-44-4	Ethane, 1,1'-oxybis[2-chloro-
U184	76-01-7	Ethane, pentachloro-
U208	630-20-6	Ethane, 1,1,1,2-tetrachloro-
U209	79-34-5	Ethane, 1,1,2,2-tetrachloro-
U218	62-55-5	Ethanethioamide
U227	110-80-5	Ethanol, 2-ethoxy
U359	79-00-5	Ethane, 1,1,2-trichloro-
U173	1116-54-7	Ethanol, 2,2'-(nitrosoimino)bis-
U004	98-86-2	Ethanone, 1-phenyl-
U043	75-01-4	Ethene, chloro-
U042	110-75-8	Ethene, (2-chloroethoxy)-

Table A-2

LIST OF TOXIC WASTES
Source: 40 CFR 261.33(f)

Hazardous waste No.	Chemical Abstracts No.	Substance
U001	75-07-0	Acetaldehyde (I)
U034	75-87-6	Acetaldehyde, trichloro-
U187	62-44-2	Acetamide, N-(4-ethoxyphenyl)-
U005	53-96-3	Acetamide, N-9H-fluoren-2-yl-
U112	141-78-6	Acetic acid, ethyl ester (I)
U144	301-04-2	Acetic acid, lead salt
U214	563-68-8	Acetic acid, thallium (1+) salt
U232	93-76-5	Acetic acid, (2,4,5,-trichlorophenoxy)-
U002	67-64-1	Acetone (I)
U003	75-05-8	Acetonitrile (I,T)
U004	98-86-2	Acetophenone
U005	53-96-3	2-Acetylaminofluorene
U006	75-36-5	Acetyl chloride (C,R,T)
U007	79-06-1	Acrylamide
U008	79-10-7	Acrylic acid(I)
U009	107-13-1	Acrylonitrile
U011	61-82-5	Amitrole
U012	62-53-3	Aniline (I,T)
U014	492-80-8	Auramine
U015	115-02-6	Azaserine
U010	50-07-7	Azirino(2',3':3,4)pyrrolo[1,2-a]indole-4,7-dione,6-amino-8-[((aminocarbonyl)oxy) methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-
U157	50-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-
U016	225-51-4	3,4-Benzacridine
U017	98-87-3	Benzal chloride
U192	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-diethyl-2-propynyl)-
U018	56-55-3	Benz[a]anthracene
U094	57-97-6	Benz[a]anthracene, 7,12-dimethyl-
U012	62-53-3	Benzenamine (I,T)
U014	492-80-8	Benzenamine, 4,4'-carbonimidoylbis[N,N-dimethyl-
U049	3165-93-3	Benzenamine, 4-chloro-2-methyl-
U093	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-
U328	95-53-4	Benzenamine, 2-methyl-
U353	106-49-0	Benzenamine, 4-methyl-
U158	101-14-4	Benzenamine, 4,4'-methylenebis[2-chloro-
U222	636-21-5	Benzenamine, 2-methyl-, hydrochloride
U181	99-55-8	Benzenamine, 2-methyl-5-nitro-
U019	71-43-2	Benzene
U038	510-15-6	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy, ethyl ester
U030	101-55-3	Benzene, 1-bromo-4-phenoxy-
U035	305-03-3	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-
U037	108-90-7	Benzene, chloro-
U221	25376-45-8	Benzenediamine, ar-methyl-
U028	117-81-7	1,2-Benzenedicarboxylic acid, [bis(2-ethylhexyl)] ester
U069	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester
U088	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester
U102	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester
U107	117-84-0	1,2-Benzenedicarboxylic acid, di-n-octyl ester
U070	95-50-1	Benzene, 1,2-dichloro-
U071	541-73-1	Benzene, 1,3-dichloro-
U072	106-46-7	Benzene, 1,4-dichloro-
U060	72-54-8	Benzene, 1,1'-(2,2-dichloro-ethylidene) bis[4-chloro-
U017	98-87-3	Benzene, (dichloromethyl)-
U223	26471-62-5	Benzene, 1,3-diisocyanatomethyl- (R,T)
U239	1330-20-7	Benzene, dimethyl- (I,T)
U201	108-46-3	1,3-Benzenediol
U127	118-74-1	Benzene, hexachloro-
U056	110-82-7	Benzene, hexahydro- (I)
U220	108-88-3	Benzene, methyl-
U105	121-14-2	Benzene, 1-methyl-2,4-dinitro-
U106	606-20-2	Benzene, 2-methyl-1,3-dinitro-
U055	98-82-8	Benzene, (1-methylethyl)- (I)
U169	98-95-3	Benzene, nitro- (I,T)
U183	608-93-5	Benzene, pentachloro-
U185	82-68-8	Benzene, pentachloronitro-
U020	98-09-9	Benzenesulfonic acid chloride (C,R)
U020	98-09-9	Benzenesulfonyl chloride (C,R)
U207	95-94-3	Benzene, 1,2,4,5-tetrachloro-
U061	50-29-3	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-
U247	72-43-5	Benzene, 1,1'-(2,2,2-trichloroethylidene)[4-methoxy-
U023	98-07-7	Benzene, (trichloromethyl)- (C,R,T)
U234	99-35-4	Benzene, 1,3,5-trinitro- (R,T)
U021	92-87-5	Benzidine
U202	[1]81-07-2	1,2-Benzisothiazol-3-(2H)-one,1,1-dioxide and salts
U203	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-
U141	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-
U090	94-58-6	1,3-Benzodioxole, 5-propyl-
U064	189-55-9	Benzo[rst] pentaphene
U022	50-32-8	Benzo[a]pyrene
U197	106-51-4	p-Benzoquinone
U023	98-07-7	Benzotrichloride (C,R,T)
U085	1464-53-5	2,2'-Bioxirane (I,T)
U021	92-87-5	[1,1'-Biphenyl]-4,4'-diamine
U073	91-94-1	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-
U091	119-90-4	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-
U095	119-93-7	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-
U027	39638-32-9	Bis(2-chloroisopropyl) ether
U024	111-91-1	Bis(2-chloromethoxy) ethane
U028	117-81-7	Bis(2-ethylhexyl) phthalate
U225	75-25-2	Bromoform
U030	101-55-3	4-Bromophenyl phenyl ether
U128	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-
U172	924-16-3	1-Butanamine, N-butyl-N-nitroso-
U031	71-36-3	1-Butanol (I)
U159	78-93-3	2-Butanone (I,T)
U160	1338-23-4	2-Butanone peroxide (R,T)
U053	4170-30-3	2-Butenal
U074	764-41-0	2-Butene, 1,4-dichloro- (I,T)

Table A-1 (cont'd)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
F020	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of Hexachlorophene from highly purified 2,4,5-trichlorophenol.).	(H)
F021	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives.	(H)
F022	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra- , penta-, or hexachlorobenzenes under alkaline conditions.	(H)
F023	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of Hexachlorophene from highly purified 2,4,5-trichlorophenol.).	(H)
F026	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.	(H)
F027	Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing Hexachlorophene sythesized from prepunfied 2,4,5-trichlorophenol as the sole component.).	(H)

Hazardous waste No.	Chemical Abstracts No.	Substance
P060	465-73-6	1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5beta,8beta,8abeta)-
P037	60-57-1	2,7:3,6-Dimethanonaphth[2,3b]oxirane, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2aalpha,3beta,6beta,6aalpha,7beta,7aalpha)-
P051	72-20-8	2,7:3,6-Dimethanonaphth[2,3b]oxirane, octahydro-, (1aalpha,2beta,2abeta,3alpha,6alpha,6abeta,7beta,7aalpha)-
P044	60-51-5	Dimethoate
P045	39196-18-4	3,3-Dimethyl-1-(methylthio)-2-butanone, O-[(methylamino)carbonyl] oxime
P085	152-16-9	Octamethylpyrophosphoramide
P087	20816-12-0	Osmium oxide
P087	20816-12-0	Osmium tetroxide
P088	145-73-3	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
P089	56-38-2	Parathion
P034	131-89-5	Phenol, 2-cyclohexyl-4,6-dinitro-
P048	51-28-5	Phenol, 2,4-dinitro-
P047	[1]534-52-1	Phenol, 2-methyl-4,6-dinitro- and salts
P020	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-
P009	131-74-8	Phenol, 2,4,6-trinitro-, ammonium salt (R)
P092	62-38-4	Phenylmercury acetate
P093	103-85-5	Phenylthiourea
P094	298-02-2	Phorate
P095	75-44-5	Phosgene
P096	7803-51-2	Phosphine
P041	311-45-5	Phosphoric acid, diethyl 4-nitrophenyl ester
P039	298-04-4	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester
P094	298-02-2	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester
P044	60-51-5	Phosphorodithioic acid, O,O-dimethyl S[2-(methylamino)-2-oxoethyl] ester
P043	55-91-4	Phosphorofluoridic acid, bis(1-methylethyl) ester
P089	56-38-2	Phosphorothioic acid, O,O-diethyl O-(p-nitrophenyl) ester
P040	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester
P097	52-85-7	Phosphorothioic acid, O-[4-((dimethylamino)-sulfonyl)phenyl] O,O-dimethyl ester
P071	298-00-0	Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester
P110	78-00-2	Plumbane, tetraethyl-
P098	151-50-8	Potassium cyanide
P099	506-61-6	Potassium silver cyanide
P070	116-06-3	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime
P101	107-12-0	Propanenitrile
P027	542-76-7	Propanenitrile, 3-chloro-
P069	75-86-5	Propanenitrile, 2-hydroxy-2-methyl-
P081	55-63-0	1,2,3-Propanetriol, trinitrate (R)
P017	598-31-2	2-Propanone, 1-bromo-
P102	107-19-7	Propargyl alcohol
P003	107-02-8	2-Propenal
P073	13463-39-3	Nickel carbonyl
P073	13463-39-3	Nickel carbonyl, (T-4)-
P075	[1]54-11-5	Nicotine and salts
P076	10102-43-9	Nitric oxide
P077	100-01-6	p-Nitroaniline
P078	10102-44-0	Nitrogen dioxide
P076	10102-43-9	Nitrogen oxide NO
P078	10102-44-0	Nitrogen oxide NO_2
P081	55-63-0	Nitroglycerine (R)
P082	62-75-9	N-Nitrosodimethylamine
P084	4549-40-0	N-Nitrosomethylvinylamine
P074	557-19-7	Nickel cyanide
P005	107-18-6	2-Propen-1-ol
P067	75-55-8	1,2-Propylenimine
P102	591-08-2	2-Propyn-1-ol
P008	504-24-5	Pyridinamine
P075	[1]54-11-5	Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)-, and salts
P111	107-49-3	Pyrophosphoric acid, tetraethyl ester
P103	630-10-4	Selenourea
P104	506-64-9	Silver cyanide
P105	26628-22-8	Sodium azide
P106	143-33-9	Sodium cyanide
P107	1314-96-1	Strontium sulfide
P108	[1]57-24-9	Strychnidin-10-one, and salts
P018	357-57-3	Strychnidin-10-one, 2,3-dimethoxy-
P108	[1]57-24-9	Strychnine and salts
P115	10031-59-1	Sulfuric acid, thallium(I) salt
P109	3689-24-5	Tetraethyldithiopyrophosphate
P110	78-00-2	Tetraethyl lead
P111	107-49-3	Tetraethylpyrophosphate
P112	509-14-8	Tetranitromethane (R)
P062	757-58-4	Tetraphosphoric acid, hexaethyl ester
P113	1314-32-5	Thallic oxide
P113	1314-32-5	Thallium(III) oxide
P114	12039-52-0	Thallium(I) selenide
P115	10031-59-1	Thallium(I) sulfate
P109	3689-24-5	Thiodiphosphoric acid, tetraethyl ester
P045	39196-18-4	Thiofanox
P049	541-53-7	Thioimidodicarbonic diamide
P014	108-98-5	Thiophenol
P116	79-19-6	Thiosemicarbazide
P026	5344-82-1	Thiourea, (2-chlorophenyl)-
P072	86-88-4	Thiourea, 1-naphthalenyl-
P093	103-85-5	Thiourea, phenyl-
P123	8001-35-2	Toxaphene
P118	75-70-7	Trichloromethanethiol
P119	7803-55-6	Vanadic acid, ammonium salt
P120	1314-62-1	Vanadium(V) oxide
P084	4549-40-0	Vinylamine, N-methyl-N-nitroso-
P001	81-81-2	Warfarin
P121	557-21-1	Zinc cyanide
P122	1314-84-7	Zinc phosphide (R,T)

[1]CAS Number given for parent compound only.

Table A-1

LIST OF ACUTE HAZARDOUS WASTES
Source: 40 CFR 261.33(e)

Hazardous waste No.	Chemical Abstracts No.	Substance
P023	107-20-0	Acetaldehyde, chloro-
P002	591-08-2	Acetamide, N-(aminothioxomethyl)-
P057	640-19-7	Acetamide, 2-fluoro-
P058	62-74-8	Acetic acid, fluoro-, sodium salt
P066	16752-77-5	Acetimidic acid, N-[(methylcarbamoyl)oxy] thio-, methyl ester
P002	591-08-2	1-Acetyl-2-thiourea
P009	131-74-8	Ammonium picrate (R)
P119	7803-55-6	Ammonium vanadate
P010	7778-39-4	Arsenic acid
P012	1327-53-3	Arsenic oxide As_2
P011	1303-28-2	Arsenic oxide As_2O_5
P011	1303-28-2	Arsenic pentoxide
P012	1327-53-3	Arsenic trioxide
P038	692-42-2	Arsine, diethyl-
P036	696-28-6	Arsonous dichloride, phenyl-
P054	151-56-4	Aziridine
P013	542-62-1	Barium cyanide
P024	106-47-8	Benzenamine, 4-chloro-
P077	100-01-6	Benzenamine, 4-nitro-
P028	100-44-7	Benzene, (chloromethyl)-
P042	51-43-4	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)
P046	122-09-8	Benzeneethanamine, alpha,alpha-dimethyl-
P014	108-98-5	Benzenethiol
P001	[1]81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, and salts
P028	100-44-7	Benzyl chloride
P015	7440-41-7	Beryllium dust
P016	542-88-1	Bis(chloromethyl) ether
P017	598-31-2	Bromoacetone
P018	357-57-3	Brucine
P021	592-01-8	Calcium cyanide
P022	75-15-0	Carbon bisulfide
P022	75-15-0	Carbon disulfide
P095	75-44-5	Carbonic dichloride
P023	107-20-0	Chloroacetaldehyde
P024	106-47-8	p-Chloroaniline
P029	544-92-3	Copper cyanide
P030	——	Cyanides (soluble cyanide salts), not otherwise specified
P031	460-19-5	Cyanogen
P033	506-77-4	Cyanogen chloride
P034	131-89-5	2-Cyclohexyl-4,6-dinitrophenol
P036	696-28-6	Dichlorophenylarsine
P037	60-57-1	Dieldrin
P038	692-42-2	Diethylarsine
P041	311-45-5	Diethyl-p-nitrophenyl phosphate
P040	297-97-2	O,O-Diethyl O-pyrazinyl phosphorothioate
P043	55-91-4	Diisopropyl fluorophosphate (DEP)
P004	309-00-2	1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5alpha, 8alpha,8abeta)-
P003	107-02-8	Acrolein
P070	116-06-3	Aldicarb
P004	309-00-2	Aldrin
P005	107-18-6	Allyl alcohol
P006	20859-73-8	Aluminum phosphide (R,T)
P007	2763-96-4	5-(Aminomethyl)-3-isoxazolol
P008	504-24-5	4-alpha-Aminopyridine
P046	122-09-8	alpha, alpha-Dimethylphenethylamine
P047	[1]534-52-1	4,6-Dinitro-o-cresol and salts
P048	51-28-5	2,4-Dinitrophenol
P020	88-85-7	Dinoseb
P085	152-16-9	Diphosphoramide, octamethyl-
P039	298-04-4	Disulfoton
P049	541-53-7	2,4-Dithiobiuret
P050	115-29-7	Endosulfan
P088	145-73-3	Endothal
P051	72-20-8	Endrin
P042	51-43-4	Epinephrine
P101	107-12-0	Ethyl cyanide
P054	151-56-4	Ethyleneimine
P097	52-85-7	Famphur
P056	7782-41-4	Fluorine
P057	640-19-7	Fluoroacetamide
P058	62-74-8	Fluoroacetic acid, sodium salt
P065	628-86-4	Fulminic acid, mercury(2+)salt (R,T)
P059	76-44-8	Heptachlor
P062	757-58-4	Hexaethyltetraphosphate
P116	79-19-6	Hydrazinecarbothioamide
P068	60-34-4	Hydrazine, methyl-
P063	74-90-8	Hydrocyanic acid
P063	74-90-8	Hydrogen cyanide
P096	7803-51-2	Hydrogen phosphide
P064	624-83-9	Isocyanic acid, methyl ester
P060	465-73-6	Isodrin
P007	2763-96-4	3(2H)-Isoxazolone, 5-(aminomethyl)-
P092	62-38-4	Mercury, (acetato-O)phenyl-
P065	628-86-4	Mercury fulminate (R,T)
P082	62-75-9	Methanamine, N-methyl-N-nitroso-
P016	542-88-1	Methane, oxybis(chloro-
P112	509-14-8	Methane, tetranitro- (R)
P118	75-70-7	Methanethiol, trichloro-
P050	115-29-7	6,9-Methano-2,4,3-benzodioxathiepen, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide
P059	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
P066	16752-77-5	Methomyl
P067	75-55-8	2-Methylaziridine
P068	60-34-4	Methyl hydrazine
P064	624-83-9	Methyl isocyanate
P069	75-86-5	2-Methyllactonitrile
P071	298-00-0	Methyl parathion
P072	86-88-4	alpha-Naphthylthiourea

leachate from disposal of a particular hazardous waste will pollute ground water.

There are 14 constituents that EPA has established concentration limits for in the EP toxicity test, including eight metals and six pesticides. Each of these contaminants has been assigned a specific EPA hazardous waste number. These contaminants, their associated EPA hazardous waste number, and the established concentration limits are listed in Table B-1. If a representative sample of a waste if found to contain any of the contaminants listed in this table at a concentration greater than or equal to those limits specified, the waste is considered an EP toxic hazardous waste.

- A liquid which corrodes steel at a rate greater than 6.35 millimeters (0.250 inches) per year at a temperature of 130°F as determined by specific test methods.

A waste exhibiting any of these characteristics of corrosivity is identified for regulatory purposes with an EPA hazardous waste number of D002.

CHARACTERISTIC OF REACTIVITY

A waste exhibiting the characteristic of reactivity is one that is unstable or undergoes rapid or violent chemical reactions with water or other material. Examples of reactive wastes include cyanide plating wastes, waste bleaches, and other waste oxidizers. The specific characteristics of a reactive waste include the following:

- It is normally unstable and readily undergoes violent changes without detonating.
- It reacts violently with water.
- It forms a potentially explosive mixture with water.
- It generates toxic gases, vapors, or fumes when mixed with water.
- It is a cyanide or sulfide bearing waste which can generate toxic gases, vapors, or fumes when exposed to pH conditions between 2.0 and 12.5.
- It is capable of detonation or a explosive reaction under standard temperature and pressure conditions or if subjected to a strong initiating source or if heated.

A waste exhibiting any of these reactive characteristics is identified for regulatory purposes with an EPA hazardous waste number of D003.

CHARACTERISTIC OF EP TOXICITY

EPA has designed a leaching test, called the Extraction Procedure (EP), to measure the amount of toxic materials that can be extracted from the waste under specific conditions. If the extract obtained from the test exceeds set concentration limits for certain constituents, the waste will be considered hazardous. The EP toxicity test is used to determine whether

APPENDIX B

IDENTIFYING RCRA CHARACTERISTIC HAZARDOUS WASTES

EPA has identified four characteristics which cause a waste to be regulated as a hazardous waste: ignitable, corrosive, reactive, and extraction procedure (EP) toxic. For each characteristic, EPA has developed approved methods for determining whether a waste is hazardous. A brief description of each characteristic and applicable tests follows. The specific definitions of these characteristics are specified in 40 CFR 261, Subpart C.

CHARACTERISTIC OF IGNITABILITY:

A waste exhibits the characteristic of ignitability if a representative sample of the waste is easily combustible or flammable. Examples of these ignitable wastes include paint wastes, certain degreasers, and solvents. The specific characteristics of an ignitable waste include the following properties:

- A liquid that has a flash point of less than 140°F as determined by a specific test method. This does not include aqueous solutions containing less than 24% alcohol by volume.
- It is not a liquid but is capable of causing fire through friction, absorption of moisture, or spontaneous chemical changes under standard temperature and pressure conditions.
- It is an ignitable compressed gas.
- It is an oxidizer.

A waste exhibiting any of these characteristics of ignitablility is identified for regulatory purposes with an EPA hazardous waste number of D001.

CHARACTERISTIC OF CORROSIVITY

A waste exhibiting the characteristic of corrosivity will dissolve metal or burn the skin. Examples of corrosive wastes include waste rust removers, waste acids and alkaline solutions, and waste battery acids. The specific characteristics of a corrosive waste include the following:

- An aqueous waste with a pH less than or equal to 2.0 or greater than or equal to 12.5 as determined by an EPA-approved method.

WASTE MANAGEMENT

Contacts:

Waste Exchange Program - This program, sponsored by the Montana Chamber of Commerce, is an informational exchange program designed bring together generators and users of a waste which have a reuse or recycling value. The program is intended to put generators in contact with waste users that can reuse the waste as a feedstock or substitute material in their operations. The Chamber of Commerce publishes a free newletter which lists both waste generators with potentially reusable waste materials, and users who are in the market for a particular reusable waste material.

The state chamber can be contacted at 110 Neill Avenue, Helena, Montana, 59601. The telephone number is (406) 442-2405.

APPENDIX C: REFERENCES AND CONTACTS

FEDERAL REGULATIONS

Code of Federal Regulations: The RCRA regulations addressed in this manual are referenced in the Code of Federal Regulations, Title 40, Parts 260 to 272.

Copies of the Code of Federal Regulations are available in most large public libraries. They may also be purchased from the Government Printing Office by calling (202) 783-3238.

RCRA Hotline: As a public service, the U.S. Environmental Protection Agency has provided a RCRA Hotline where anyone can call for technical or administrative information regarding the RCRA regulations.

The phone number for the RCRA Hotline is: 1-800-424-9346 (Hours from 8:30 a.m. to 4:30 p.m. EST, Monday through Friday)

References:

(1) "Understanding the Small Quantity Generator Rules: A Handbook for Small Business", published by EPA, Office of Solid Waste and Emergency Response, September, 1986. (EPA Publication No. EPA/530-SW-86-019) This is a handy, easy-to-read, reference for understanding the small quantity generator regulations.

(2) Handbook of Hazardous Waste Management for Small Quantity Generators, by Russell.W. Phifer and William .R McTigue, Jr., Lewis Publishers, Inc., 1988. This book provides a guide to the small quantity generator requirements, waste types generated from various industries, liability considerations, and onsite and offsite management of hazardous wastes.

STATE REGULATIONS

Administrative Rules of Montana: The state regulations addressed in this manual can be found in the Administrative Rules of Montana, Rule 16, Chapter 44.

Montana Department of Health and Environmental Science (DHES): The DHES can provide assistance to anyone with questions or concerns about the federal and state regulations, compliance issues, or waste management practices.

For further information, contact the DHES, Solid and Hazardous Waste Bureau, Room B201, Cogswell Building, Helena, Montana, 59620. The phone number is: (406) 444-2821.